Release Notice of New Cultivar

United States Department of Agriculture
Soil Conservation Service

and

United States Department of Agriculture
Science and Education Administration

Agricultural Research

Notice of Release of 'Cardan' Green Ash

The United States Department of Agriculture, Soil Conservation Service and the Science and Education Administration, Agricultural Research announce the naming and release of 'Cardan' green ash for conservation and amenity plantings in the northern Great Plains.

Description: 'Cardan' green ash (Fraxinus pennsylvanica Marsh.) is a medium sized tree that may attain a height of 50 feet on favorable soils. The crown is round-topped with small, slender, spreading branches. The bark is ashy gray, shallowly furrowed, with narrow interlacing ridges. The leaves are opposite, pinnately compound with seven (rarely five or nine) leaflets. The leaflets are ovate to elliptic in shape with slightly toothed margins that are often smooth below the middle. The upper surface of the leaflet is dark green and smoooth while the lower is a pale green with minute scattered hairs on the midrib. Autumnal color is a pale- to golden-yellow. Individual trees are either male or female. The nonshowy flowers appear in early May, the seed matures by September and often remains on the tree well into the winter. The winged fruit is 3 to 4 mm long, 4 to 7 mm wide with a pointed, or slightly notched, apex.

Origin: This selection of green ash has been tested as Mandan-12002 at the Northern Great Plains Research Center, Mandan, North Dakota. It originated from open-pollinated seed collected in 1954 from several trees growing in a farmstead windbreak near Carlyle, Montana. The seed trees were selected for their freedom from attack by the ash borer (Podosesia syringae fraxini Lugger X) which had heavily infested all of the other green ash trees in the windbreak. Four seedlings grown from the open-pollinated seed were established at the Mandan Station in 1957. Open-pollinated seed produced by the three females of the four trees was used to grow seedlings for field test plantings. At the age of 5 years. one of these field plantings at Kimball, South Dakota on the farm of Oscar Olsen has been rogued of poorly formed, inferior trees and the open-pollinated seed produced by the female trees is being certified and released for commercial production of planting stock.

Uses: 'Cardan' green ash is recommended for use as a tall tree in farmstead and field windbreaks, and as a deciduous hardwood component of wildlife habitat and natural area plantings associated with revegetation of surface mined lands, flood plains and other disturbed areas.

Performance: 'Cardan' green ash has been extensively evaluated in farmstead and field windbreak plantings in North Dakota, south Dakota, western Minnesota and adjacent states. It has performed well on a wide range of soils and climatic conditions, typical of the northern Great Plains. An evaluation of performance data identifies clean cultivation as the primary factor affecting survival and rate of growth. Performance may be adversely affected by drought, injury caused by animals, insects, diseases and herbicides.

'Cardan' green ash has a potential of growing at a rate of 2.8 feet (85.3 cm) per year in eastern South Dakota, Major Land Resource Area 102A, windbreak suitability group-3; a well drained, medium textured soil with an average annual precipitation of 21 (53.3 cm) inches. The data from nine clean-tilled 3- to 9-year-old field plantings in South Dakota indicate 95 percent survival with a mean annual rate of growth of 1.9 feet (57.9 cm). In nine similar plantings in North Dakota, 'Cardan' averaged 92 percent survival. and a mean annual rate of growth of 1.5 feet (45.7 cm).

Adaptation: The primary area of adaptation (Fig.-1) includes the Northern Great Plains Region, Major Land Resource Areas 53A and 53B-Dark Brown Glaciated Plains; 54-Rolling Soft Shale Plain; 55A and 55B-Black Glaciated Plain; 56-Red River Valley of the North; 58C and 58D-Northern Rolling High Plains; 61-Black Hills Footslope; and the Central Region, Land Resource Area 102A-Loess, Till and Sandy Prairies. The physical features of each major land resource area are described in "Land Resource Regions and Major Land Resource Areas of the united States" (Austin 1965).

Provisional Tree and Shrub Seed Zones: Seed collection zones are subdivisions of land areas established to identify seed sources and to control movement of seed and planting stock (Cunningham 1975). 'Cardan' green ash is recommended for use primarily in zones: 531, 532, 533, 541, 542, 551, 552, 553, 561, 562, 583, 584, 600, and 1021. 'Cardan' will perform in an acceptable manner LOO-150 miles south of the primary area of adaptation shown on the attached map. It is not recommended beyond this area.

soils: 'Cardan' green ash is recommended for planting on the wide range of soils that occur in Soil Conservation service, Technical Guide, Windbreak Suitability Group 1 (deep, fine to moderately fine textured, well drained) through 6 (shallow to moderately coarse to coarse textured soils) in North Dakota and south Dakota. Refer to Soil Conservation Service Technical Guides for windbreak suitability group descriptions.

Climate, Elevation and Topography: The average annual precipitation of the area of adaptation for 'Cardan' ranges from 10 to 25 inches (25.4 to 63.5 cm), increasing from west to east, with the highest amount occurring during the growing season. Winter precipitation is snow, which accumulates in drifts of varying depths modifying the micro-climate in windbreaks. The average annual temperatures range from 40 to 45 degrees F (4 to 7 degrees C), average frost-free period is 100 to 140 days. The plant hardiness zones include 3a, 3b, and 4d with average annual minimum temperatures that range from 40 to 30 degrees F (USDA, ARS 1960). The elevation ranges from 1,000 to 4,000 feet (300 to 1200 m) increasing from east to west. The glacial plain is nearly level to gently rolling with hilly to steep slopes bordering the Missouri River and its major tributaries and streams.

Propagation: 'Cardan' green ash is a seed propagated cultivar. In a bare-root nursery, the seed may be sown in the fall without stratification. The seeds should be sown as soon as collected. Fall sown beds should be mulched with burlap or straw, and the mulch removed as soon as germination starts in the spring. spring sown seed, or that used in greenhouse propagation, should be stratified. Dry seed should be soaked 3 to 5 days in cold running water. Stratify in moist sand or peat for 60 days at 69 degrees F (20 degrees C) and 60 to 120 days at 32 to 41 degrees F (0 to 5 degrees C) (Bonner 1974). Optional: Soak seed in a cloth sack for 21 days under cold running water, stratify for 10 days in moist sand at 32 to 41 degrees F (0 to 5 degrees C) or until white specks appear on ash seed, then plant immediately (McDermand 1967). Seeds should be covered with 3/4 inch (18 mm) of soil at a bed density of 10 to 20 seedlings per square foot (110 to 200/m2). Planting stock should be 2 to 0 with a top height of 12 to 24 inches (30 to 60 mm).

Sources of Seed and Planting Stock: The USDA-SEA-Agricultural Research, Northern Great Plains Research Center, Mandan, North Dakota in cooperation with the USDA-Soil Conservation Service, Plant Materials Center, P. O. Box 1458, Bismarck, ND, 58501 will maintain breeder seed and foundation stock of 'Cardan' green ash. Certified seed (selected class) will be available from growers approved by the State Certified Seed Departments. standards for all classes of seed are published in the North Dakota Tree and Shrub Certification Standards (ND State Seed Department 1974).

References:

Austin, Morris E. 1965. Land resource regions and major land resource areas of the United States, USDA Handb. 296, 82 p. (currently being revised, Map-5, 0-36, 687, B-28-78).

Bonner, F. T. 1974. Seeds of woody plants of the United States, Fraxinus - ash. USDA, For. Serv. Handb. 450:411-416.

Cunningham, Richard A. 1975. Provisional tree and shrub seed zones for The Great Plains. USDA For. Serv. Res. Pap. RM-150, 15 p.

North Dakota State Seed Department. 1974. North Dakota tree and shrub standards. Supplement to Bul. 51-T, March 1974, 14 p.

McDermand, John 1967. Notes--stratification procedures (un Publ.) USDA, SCS, Bismarck, ND.

U.S. Department of Agriculture, ARS. 1960. Plant hardiness zone map. USDA Misc. Publ. 814.

T. B. Kennedy
Acting Deputy Director

May 15, 1979
Date

Agricultural Research
Science and Education Administration
United States Department of Agriculture
Washington, D.C.

Thomas M. Shiflet
Director

May 8, 1979
Date

Ecological Sciences and Technology Division
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/s/ Allen L. Fisk
State Conservationist

May 8, 1979
Date

United States Department of Agriculture
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Bismarck, North Dakota

Figure -1. - THE **PRIMARY** AREA OF ADAPTATION OF 'CARDAN' GREEN **ASH**
(adapted from Austin 1965)